Superfund Program **EPA**
Proposed Plan **Region 5**

U.S. Smelter and Lead Refinery Superfund Site – Operable Unit 1

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative for cleaning up the contaminated soil in the residential area, Operable Unit 1 (OU1), of the U.S. Smelter and Lead Refinery (USS Lead) Superfund Site and provides the rationale for this preference. This Proposed Plan also includes summaries of other cleanup alternatives evaluated for use at this Site. This document is issued by the United States Environmental Protection Agency (EPA), the lead agency for site activities. The Indiana Department of Environmental Management (IDEM) is the support agency. EPA, in consultation with IDEM, will select a final remedy for the Site after it reviews and considers all information submitted during the 30-day public comment period. EPA, in consultation with IDEM, may modify the Preferred Alternative or select another response action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan.

Dates to remember:

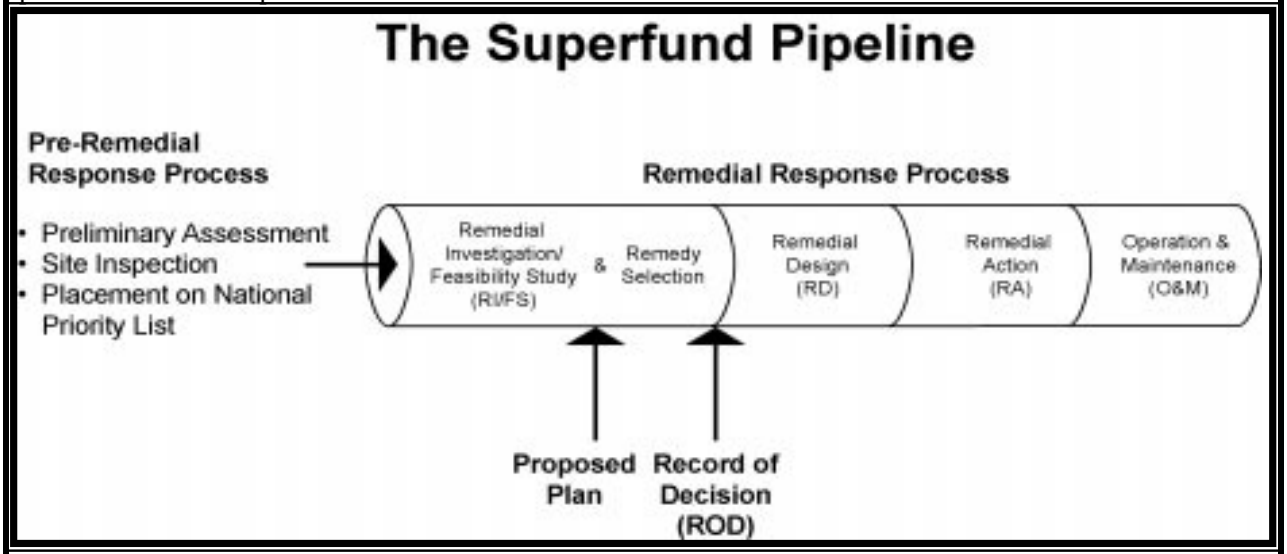
PUBLIC COMMENT PERIOD:
July 12, – August 11, 2012
U.S. EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING:
July 25, 2012
U.S. EPA will hold a public meeting to explain the Proposed Plan and all the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at the East Chicago Public Library (2401 E. Columbus Drive, East Chicago, IN) at 6:00 pm.

For more information, see the Administrative Record at the following locations:

East Chicago Public Libraries
2401 E. Columbus Drive
(219) 397-2453
1008 W. Chicago Avenue
(219) 397-5505
East Chicago, Indiana 46312
9:00 a.m. - 8:00 p.m.
Monday – Thursday
9:00 a.m. - 5:00 p.m.
Friday & Saturday

U.S. EPA Records Center
Region 5 (SR-7J)
77 W. Jackson Blvd.
(312) 353-1063
Monday–Friday: 8 am to 4 pm
call for appointment



EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 40 CFR 300.430(f)(2) of the "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP). This Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation (RI) and Feasibility Study (FS) reports and other documents contained in the Administrative Record. The Administrative Record file for this site can be found at the East Chicago Public Library at 2401 E Columbus Ave. and EPA's Region 5 office in Chicago. EPA and IDEM encourage the public to review these documents to gain a more comprehensive understanding of the Site and Superfund activities that have been conducted at the Site to date.

SITE HISTORY

The USS Lead Site comprises two separate areas each of which is called an Operable Unit (OU). OU1 is a residential area located in the southern portion of the City of East Chicago, north of the former USS Lead industrial facility. The USS Lead facility is referred to as OU2. Both OU1 and OU2 are located in East Chicago, Indiana, which is surrounded by a heavily industrialized area that includes steel mills, oil refineries, heavy manufacturing, chemical processing plants, and heavy rail facilities.

This Proposed Plan focuses on the site investigation and cleanup of OU1. The site history for OU2 is included for background information only.

USS Lead is a former lead smelter located at 5300 Kennedy Avenue, East Chicago, Indiana. The facility (OU2) was constructed in the early 1900s by the Delamar Copper Refinery Company to produce copper. In 1920, the property was purchased by U.S. Smelting, Refining, and Mining, and later by USS Lead. USS Lead operated a primary lead smelter at the facility. An electrolytic process called the "Betts process" was used for refining lead ores into high-purity lead. The Betts process can release metals during production.

Between 1972 and 1973, the facility was converted into a secondary lead smelter, which instead of refining lead ore recovered lead from scrap metal and automotive batteries. All operations at OU2 were discontinued in 1985. Two primary waste materials were generated as a result of the smelting operations: (1) blast-furnace slag and (2) lead-containing dust from the blast-furnace stack. Blast-furnace slag was stockpiled south of the plant building and once per year spread over an adjoining 21 acres of wetlands. The blast-furnace baghouse collected approximately 300 tons of baghouse flue dust per month during maximum operating conditions. Some of the flue dust escaped the baghouse capture system and was deposited in the residential area. By the late 1970s, USS Lead stored onsite approximately 8,000 tons of baghouse dust.

The East Chicago area in the vicinity of OU1 and OU2 has historically supported a variety of industries. In addition to the USS Lead smelting operation, EPA has concluded that other industrial operations may have managed lead and other metals. Immediately east of OU2 and south of the eastern portion of OU1, is a facility formerly operated by DuPont and currently leased and operated by W.R. Grace & Co., Grace Davison. One of the processes that took place at the DuPont facility was the manufacturing of the pesticide, lead arsenate. Northwest of the USS Lead Site, west of Gladiola Street and north of 151st Street, two smelter operations reportedly managed lead and other metals. A site map generated during the 1930s identifies two additional operations: International Lead Refining Company conducted metal refining, and Anaconda Copper Company manufactured white lead and zinc oxide. The successor-in-interest to Anaconda Copper Company is ARCO.

United States Geological Survey historical aerial photographs show that the residential area (OU1) was a low-lying area that appears to have been backfilled prior to 1939. By 1959, most of the homes in the residential area had been constructed. These photographs also show that the Anaconda Copper Company occupied the area where both the Gosch Elementary School and the public housing residential complex immediately south of the school are currently located (the southwest portion

of OU1). The Gosch Elementary School and the East Chicago Public Housing complex were built on the former Anaconda Copper Company site after 1959. Copies of these photographs are included in the USS Lead RI Report.

Starting in 1993, USS Lead began a cleanup at its facility (OU2) pursuant to an agreement with EPA under the Resource Conservation and Recovery Act (RCRA). USS Lead has addressed the majority of the contamination in and around OU2 by excavating contaminated soils and consolidating those soils within a corrective action management unit located within OU2. As part of the OU2 RCRA activities, investigations were conducted in the residential area now known as OU1 to investigate the source and identify the extent of lead-contaminated soils. Modeling of air deposition of lead in the residential area was also performed.

Responsibility for the further investigation of conditions at OU1 and OU2 was transferred from EPA's RCRA program to its Superfund program. The Superfund program was successful in listing the USS Lead Site on the National Priorities List (NPL) in April 2009. Listing on the NPL makes the site eligible for a cleanup funded by the federal government. As part of the NPL listing process, EPA evaluated contaminant concentrations focusing on the southwest part of the residential area. This evaluation was expanded to cover the entirety of OU1, sampling 7% of the properties, as a part of the full-scale remedial investigation. During these investigations, EPA identified properties with lead concentrations in surface soils greater than 1,200 milligrams per kilogram (mg/kg). Lead in surface soils in concentrations greater than 1,200 mg/kg poses an imminent and substantial threat to human health. EPA's emergency response program addressed these most highly-contaminated parcels by removing the contaminated soils and backfilling the areas with clean fill soils. A total of twenty-nine properties were remediated by the Superfund emergency response program in 2008 and 2011.

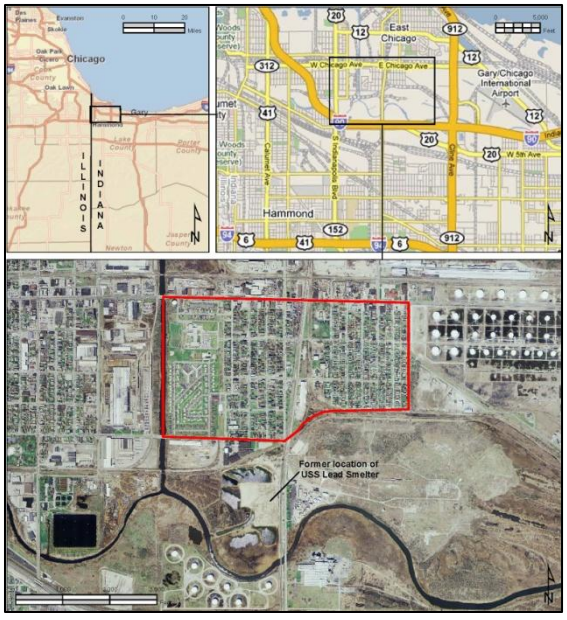
Although some residential properties have been cleaned up, contamination remains at many properties within OU1. This proposed plan sets forth EPA's approach for addressing contaminated soils throughout OU1 that still require cleanup.

SITE CHARACTERISTICS

The USS Lead Site lies approximately 18 miles southeast of Chicago, Illinois, in East Chicago, Indiana. The City of East Chicago has a total area of 15.6 square miles (mi^2), of which 12 mi^2 are land and 3.6 mi^2 are water. As shown in the figure below, USS Lead is located in the southern portion of the City of East Chicago. In the lower pane of the figure, OU1 is demarcated by red lines.

USS Lead Site Residential Area Location Map

OU1 encompasses approximately 322 acres and is bounded by East Chicago Avenue on the north, East 151st Street on the south, the Indiana Harbor Canal on the west, and Parrish Avenue on the east (see figure below). OU1 is a mixed residential (95%) and commercial/industrial (5%) area north of the former industrial facility. This mixed-use area includes (1) numerous residences, including single and multi-family homes, and a public housing area in the southwest corner of the area, (2) various generally small commercial/industrial operations, (3) various municipal and community offices and operations, (4) two schools (the Carrie Gosch



Elementary School and the Carmelite School for Girls), (5) four parks, and (6) numerous places of worship. Residences, schools, and parks constitute the vast majority of properties within OU1.

EPA conducted remedial investigation field activities at the USS Lead Site between December 2009 and August 2010. Significant findings and conclusions from the site-characterization activities completed during the RI are summarized below. Additional detail about site characteristics is provided in the RI Report.

Geologic and Hydrogeologic Setting

During site investigations, five main soil varieties were identified within OU1. These include organic topsoil, fill, fill with construction debris, and fill with slag, all of which overlie native sand. All but the native sand were found from the surface down to depths of as much as 24 inches below ground surface (bgs). Native sand was typically located 18 to 24 inches bgs. Nearby soil borings indicate that the Equality Formation underlies the top few feet of soils at OU1. The Equality Formation, also known as the Calumet Aquifer, is primarily a sand unit with some silts, clays, and gravel lenses. The Equality Formation is estimated to extend to approximately 25 feet bgs.

EPA did not evaluate groundwater as part of the remedial investigation for OU1. Site-wide groundwater will be investigated as part of the OU2 remedial investigation.

Investigation Results

Between December 2009 and August 2010, EPA collected surface and subsurface soil samples from a total of 88 properties. These properties were distributed nearly evenly over OU1 in order to provide uniform coverage of the area and to better understand the nature and extent of contamination in and around OU1. EPA sampled yards at on average 3 properties per block. Samples were collected from front yards, back yards, and drip-zones. Drip zone samples were collected from soils beneath the gutters and downspouts of buildings, in order to investigate whether airborne contamination has concentrated along drip lines of roofs. Larger properties, such as parks and schools, were divided into quadrants; each quadrant was then sampled. These different sample areas within a property are referred to as "yards". EPA sampled 232 separate "yards," including:

- 75 front yards
- 70 back yards
- 27 quadrants from non-residential properties
- 60 drip zones

Yards: The term "yards" is used throughout the RI/FS and this Proposed Plan to represent one study area unit. Typically, a study area consists of a front yard, a back yard, drip zones of residential properties, or any quadrant of a park, commercial property, easement, or school. A typical property consists of two or more yards.

All soil samples were analyzed for lead. In addition, a subset of samples was analyzed for various combinations of other metals, including arsenic, and organic compounds to provide a better understanding of chemical concentrations in shallow soils at OU1.

In the RI, each sample result was screened against an analyte-specific site screening level (SSL). The SSLs were developed from the following sources: screening criteria in the *Superfund Lead-Contaminated Residential Sites Handbook;* EPA residential Regional Screening Levels; IDEM's Risk Integrated System of Closure Residential Default Closure Tables for direct contact; and site-specific background values.

Results from the RI soil investigation showed:

- Ten metals and six organic analytes exceeded screening levels.
- 123/232 yards (53%) exceeded the SSL for lead only, or for lead in combination with arsenic.
- 10/136 yards (7%) exceeded the SSL for arsenic only.

The organic compounds detected are members of a class of compounds called polycyclic aromatic hydrocarbons (PAHs). PAHs have been shown to enter the environment through the burning of fossil fuels. PAHs are typically found in soil samples

collected from urban areas. PAH concentrations in soil at OU1 were generally detected at levels at or below the typical background soil concentrations for the Chicago Metropolitan Area. EPA has determined that the PAHs in OU1 are not related to industrial activities at or in the vicinity of OU2. EPA will not clean up or require others to clean up properties specifically to address PAH contamination, but some PAH contamination will be addressed incidental to the soil cleanup anticipated at OU1.

Lead-impacted soil was identified intermittently throughout the entire area of OU1. Lead concentrations in both surface and subsurface soil samples were higher in the area west of Huish Avenue than in the eastern half of OU1. The highest arsenic and lead concentrations measured at OU1 were found in the East Chicago Housing Authority complex. The metals concentrations in soil at the East Chicago Housing Authority complex may be related to the historical operations at the Anaconda Copper Company facility, in addition to the operations at OU2. The distribution of arsenic in soil suggests that there is more than one source of arsenic in OU1.

EPA compared soil types (top soil, fill, sand, etc.) with concentrations of Constituents of Concern (COCs) and concluded that the native sands underlying the fill material are typically free from elevated metals concentrations. Detailed descriptions and analyses of the nature and extent of contamination are presented in Section 5 of the RI Report.

SCOPE AND ROLE OF THE RESPONSE ACTION

This response action for OU1 will address lead and arsenic contamination in the residential area of the USS Lead Superfund Site which poses health risks. A separate investigation will be conducted to address OU2, the former USS Lead facility and site-wide groundwater. When the subsequent investigation is complete, EPA will develop a Feasibility Study, Proposed Plan, and Record of Decision to select a final remedy for OU2.

What are the "Constituents of Concern"?

EPA and IDEM have identified two contaminants at this site that pose the greatest risk to human health.

Lead: Lead was detected in surface and subsurface soil at concentrations up to 9,406 mg/kg. Lead is highly toxic and exposure to lead can cause a range of health effects from behavioral problems and learning disabilities, to seizures and death. Children 6 years old and younger are most at-risk because their bodies are growing quickly, and exposure to lead can cause developmental problems.

Arsenic: Arsenic was detected in surface and subsurface soil at concentrations up to 567 mg/kg .Exposure to arsenic can cause various health effects, such as irritation of the stomach and intestines, decreased production of red and white blood cells, skin changes, lung irritation, and increased risk of developing skin, lung, liver, or lymphatic cancer.

SUMMARY OF SITE RISKS

As part of the RI/FS, EPA conducted a baseline Human Health Risk Assessment (HHRA) to evaluate the current and potential future effects on human health of contaminant concentrations in soil at OU1. The HHRA considered the following groups of people (receptors) for current and future land-use scenarios as part of the risk assessment:

- child, adolescent, and adult residents;
- child, adolescent, and adult recreationalists;
- adult indoor and outdoor workers.

Current land uses within OU1 include residential, recreational, educational, and industrial/ commercial properties. For the purpose of the HHRA, future land uses of all properties were assumed to be the same as current land uses. Properties such as the Carmelite Home for Girls, Carrie Gosch Elementary School, and the various parks within OU1 were included as residential properties because the receptors at these locations are residents within OU1. In addition to the primary types of receptors associated with each property (for example, adult and child residents at

residences; and students, faculty, and staff at schools, etc.), the HHRA also considered potential exposures of workers involved in utility installation, and repair and construction activities.

Residential Properties

Health risks at OU1 are driven primarily by lead concentrations in soil. Direct contact and inhalation of lead-contaminated soils pose the greatest health risks. Lead may also be ingested if residents have gardens and eat produce from the gardens. The *Superfund Lead-Contaminated Residential Sites Handbook* specifies that garden areas are to be excavated down to 24 inches or capped with 24 inches of clean fill material. Because there is uncertainty regarding where gardens may be located in the future, EPA has evaluated risks and removal strategies to a depth of 24 inches bgs over the entire yard at each property.

Ecological risks

No ecological habitats have been identified within OU1. A wetland area located within OU2 will be evaluated as part of the RI for that OU.

SUMMARY OF SITE RISKS

Lead

The HHRA evaluated lead using the IEUBK model (see box for explanation) and default exposure assumptions calculating a screening level very similar to the 400 mg/kg Regional Screening Level (RSL). For the USS Lead Site, it was judged that insufficient site-specific information (for example, localized concentrations of lead in air, water, and foodstuffs) was available to warrant calculation of a site-specific residential soil Remediation Action Level (RAL). Therefore, residential properties with average lead concentrations in soil greater than 400 mg/kg were identified as presenting potential lead risks to residential receptors.

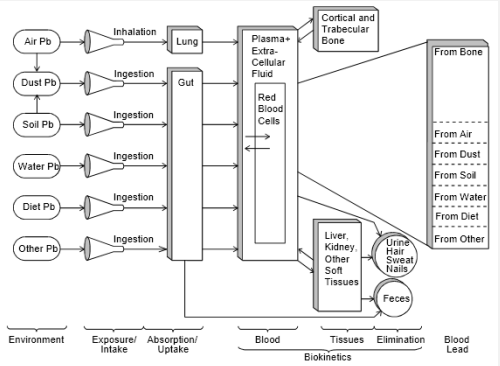
Arsenic

Though lead was found to be the most widespread contaminant at OU1, arsenic was also present at locations within the residential area. The site-specific average background concentration for arsenic in soil at OU1 was calculated to be 14.1 mg/kg. Comparison of the EPA RSL for arsenic (0.39 mg/kg) to the site-specific background concentrations indicates the presence of naturally occurring arsenic at the site above the EPA RSL.

WHAT IS IEUBK AND HOW IS IT USED?

The IEUBK lead model translates environmental lead concentrations into predicted blood lead levels in children of different ages. In order to accomplish this, the IEUBK lead model has four distinct functional components that work together in series. The IEUBK Model can be used to predict the probability that children exposed to lead in environmental media will have blood lead concentrations exceeding a health-based level of concern. The four model components are:

- Exposure Component - the exposure component relates environmental lead concentrations to the intake rate at which lead enters the child's body via the gastrointestinal (GI) tract and lungs. The lead sources for the child are air and diet (which includes dust, paint, soil, water, and other sources which enter the body through the GI tract).
- Uptake Component - the uptake component relates lead intake into the lungs or GI tract to the uptake of lead into the child's blood.
- Biokinetic Component - the biokinetic component models the transfer of absorbed lead between blood and other body tissues, or elimination of lead from the body via urine, feces, skin, hair, and nails.
- Probability Distribution Component - The probability distribution component of the model estimates blood lead concentrations for a hypothetical child or population of children.



Components of the IEUBK Model, showing environmental exposure sources and pathways, absorption compartments, critical body tissue compartments, and elimination pathways.

EPA's IEUBK model was used to develop the soil-lead preliminary cleanup level for child and adolescent receptors, including child residents, adolescent school children, and child recreationalists in accordance with EPA's "Assessing Intermittent or Variable Exposures at Lead Sites" (EPA-540-R-03

IDEM has not calculated background arsenic concentrations. However, Illinois EPA has calculated background arsenic concentrations in metropolitan soils to be 13.0 mg/kg. Although the USS Lead Site is not in Illinois, it is approximately 5 miles from the City of Chicago and the Illinois-Indiana state border. Use of the site-specific background level of 14.1 mg/kg was considered appropriate based on the similarity between the metropolitan area background levels and those measured at OU1. Further, EPA has observed that arsenic concentrations in OU1 soils are distributed around the site-specific background concentration and the Illinois EPA metropolitan background concentration. Because of the similarity between the arsenic concentrations in OU1 soils and background concentrations discussed above, it is appropriate to calculate an Upper Tolerance Limit (UTL) for arsenic to distinguish between background arsenic and arsenic caused by industrial activities in and around the site. EPA calculated a 95% UTL of 26 mg/kg for arsenic. The concentration of 26 mg/kg was taken as the upper bound of the naturally occurring (i.e. background) arsenic concentrations in soil at OU1.

SUMMARY OF IMPACTED PROPERTIES

Lead is the primary COC at OU1. The *Superfund Lead-Contaminated Residential Sites Handbook*, EPA RSLs, and the State of Indiana's Risk Integrated System of Closure Technical Resource Guidance Document set the RSL for lead at 400 mg/kg for residential areas and 800 mg/kg for industrial areas. As discussed in the RI Report, roughly 43 percent of the properties sampled exhibited risk for lead only.

Although lead was found to be the most widespread contaminant at OU1, arsenic was also present at locations within the residential area. As discussed above, the UTL for arsenic is 26 mg/kg. Results of soil testing at OU1 indicate that 20 percent of residential properties tested exceeded the RSL and UTL for both lead and arsenic while 4 percent of properties tested exceeded the UTL for arsenic alone.

Based on the representative sampling conducted during the RI, of the 1,271 properties in OU1, 53 percent or 672 properties are likely to require remedial action to address risk associated with lead. An additional 4 percent or 51 properties are likely to require remediation to address risks associated only with arsenic. In total, 723 properties are likely to require remediation.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are general descriptions of the goals to be accomplished through cleanup activities. RAOs are established by considering/evaluating the medium of concern (soil, in the case of OU1), COCs, allowable risk levels, potential exposure routes, and potential receptors.

EPA has identified the following RAO for OU1 at the USS Lead Site:

- Reduce to acceptable levels the human health risk from exposure to COCs in surface and subsurface soils through ingestion, direct contact, or inhalation exposure pathways, assuming reasonably anticipated future land-use scenarios.

A cleanup that achieves this RAO will be protective of human health and the environment.

Remedial action levels are long-term soil concentration levels used during the analysis and selection of cleanup options (remedial alternatives). The OU1 preliminary RALs comply with regulatory requirements and support the OU1 RAO. The RALs were calculated based on site-specific risks and hazards from the HHRA. The RALs listed in the table below address the RAO for soil and potential health risks associated with soil at OU1.

Soil Remedial Action Levels
OU1 - USS Lead Site
East Chicago, Indiana

Analyte Group	Analyte Name	Units	OU1 Soil RAL
Metals	Arsenic	mg/kg	26.4
	Lead	mg/kg	400 (Residential) 800 (Industrial)

SUMMARY OF REMEDIAL ALTERNATIVES

In its capacity as the lead agency, it is the EPA's judgment that the Preferred Alternative (Alternative 4A) identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health, welfare, and/or the environment from the lead and arsenic found in OU1 soils.

Remedial alternatives for the USS Lead Site are presented below. The alternatives are numbered to correspond with the numbers in the FS Report.

- **Alternative 1 – No Action**
- **Alternative 2 – Institutional Controls**
- **Alternative 3 – On-site Soil Cover + Institutional Controls**
- **Alternative 4A – Excavation of Soil Exceeding RALs + Off-site Disposal + *Ex-situ* Treatment Option**
- **Alternative 4B – Excavation to Native Sand + Off-site Disposal + *Ex-situ* Treatment Option**
- **Alternative 5 – *In-situ* Treatment by Chemical Stabilization**

In accordance with EPA guidance, the potential remedial alternatives identified in the FS and listed above were screened against three broad criteria: effectiveness (both short-term and long-term), implementability (including technical and administrative feasibility), and relative cost (capital and operation and maintenance [O&M]). The purpose of the screening evaluation was to reduce the number of alternatives chosen for a more thorough analysis. EPA eliminated Alternative 2 (institutional controls) and Alternative 5 (in-place treatment by chemical stabilization) from further consideration as they are not considered effective for OU1. Alternative 2 does not reduce human health risk from exposure to COCs because the impacted soils would remain in place. Alternative 5 was eliminated because the long-term effectiveness of in-place stabilization has not been proven. The following alternatives passed the initial screening process and were evaluated further in the FS:

<u>Alternative 1</u> – No Action
Estimated Capital Cost: $0
Estimated Total O&M Cost: $0
Estimated Present Worth Cost: $0
Estimated Construction Timeframe: None

Regulations governing the Superfund program generally require that the "no action" alternative be evaluated to establish a baseline against which EPA and the public can compare the costs and benefits of other alternatives. Under this alternative, EPA would take no action at the site to prevent exposure to the soil contamination.

<u>Alternative 3</u> – On-site Soil Cover + Institutional Controls
Estimated Capital Cost: $14,539,000
Estimated Total O&M Cost: $1,344,000
Cost Estimate Contingency: $3,055,000
Estimated Present Worth Cost: $18,239,000
Estimated Construction Timeframe: 15 months

Alternative 3 involves installing a soil cover that limits direct contact with impacted soil. A visible barrier, such as orange construction fencing or landscaping fabric, would be placed over the contaminated soil and then covered with clean soil. Contamination would be left in place and capped with a 12-inch-thick soil cover as specified in EPA's *Superfund Lead-Contaminated Residential Sites Handbook* (2003). The soil cover would be composed of 6 inches of imported select borrow material topped with 6 inches of top soil, and is meant to prevent direct contact with contaminated soil. The soil cover would be placed directly on top of the existing grade. After installation of the soil cover, each yard would be restored to its pre-remedial condition. As part of the site O&M costs, the soil cover would be inspected and repaired as necessary on a semi-annual basis for the first 5 years, followed by an annual inspection for years 6 through 30. Annual repairs would include re-grading portions of the soil cover, placing additional soil to maintain the 12-inch cover, and seeding or sodding the yards as needed. Institutional controls would be implemented to maintain the integrity of the soil cover so that users of the site would not be exposed to COCs in soil.

Institutional controls may include property restrictions, such as:

- gardening would be limited to raised beds
- all subsurface work (utility maintenance, foundation work, etc.) must be done in accordance with the Remedial Design in order to protect workers and residents
- sufficient coverage of impacted soils must be maintained.

In accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements, EPA would perform five-year reviews since impacted soil would be left in place above levels that allow for unlimited use and unrestricted exposure.

<u>Alternative 4A</u> - Excavation of Soil Exceeding RALs + Off-site Disposal + *Ex-situ* Treatment Option

Estimated Capital Cost: $20,921,000
Estimated Total O&M Cost: $67,000
Cost Estimate Contingency: $4,824,000
Estimated Present Worth Cost: $28,944,000
Estimated Construction Timeframe: 21 months

Alternative 4A involves removing impacted soil that exceeds RALs, to a maximum excavation depth of 2 feet, but leaving remaining soils in place. This alternative requires excavation of soil exceeding RALs, disposal of excavated soil at an off-site Subtitle D landfill, and, as necessary, chemical stabilization of some soil after excavation to address soil exceeding the toxicity characteristic (TC) regulatory threshold. EPA estimates that soil with lead concentrations above 2,600 mg/kg (an estimated 7% of the excavated yards at OU1) exceeds the TC regulatory threshold toxicity characteristic based on toxicity characteristic leaching criteria (TCLP) testing conducted during the RI. Soil exceeding RALs would be excavated to a depth determined by pre-remedial sampling results. The maximum excavation depth is estimated to be 24 inches. The final excavation depth (up to 24 inches) may vary based on pre-remedial sampling. Since no local stockpile area has been identified, EPA assumes that soil would be loaded directly into roll-off containers and transported to the landfill. If EPA identifies a stockpiling location that is acceptable to the community, then it will reconsider stockpiling. If contaminated soil is identified at a depth greater than 24 inches bgs, a visual barrier, such as orange construction fencing or landscape fabric, would be placed above the contaminated soil and beneath the clean backfill soil. Institutional controls would be implemented to protect the barrier, in the same way as described in Alternative 3 (except that gardening would not be limited to raised beds).

Excavated soil would be replaced with clean soil, including 6 inches of top soil, to maintain the original grade. Each yard would be restored to its pre-remedial condition. Once the properties are sodded or seeded, O&M of the sod/seed, including watering, fertilizing, and cutting, would be conducted for 30 days. After the initial 30-day period, property owners would be responsible for the maintenance of their own yards. If any soil is left in place below 24 inches bgs and exceeds RALs, a five-year review would be required in accordance with CERCLA.

Alternative 4B - Excavation to Native Sand + Off-site Disposal + *Ex-situ* Treatment Option

Estimated Capital Cost: $31,743,000
Estimated Total O&M Cost: $0
Cost Estimate Contingency:$7,304,000
Estimated Present Worth Cost: $43,822,000
Estimated Construction Timeframe: 33 months

Alternative 4B involves removing all of the soil at impacted yards to the native sand. The goal of this alternative would be the total removal of soil at identified yards, disposal of excavated soil at an off-site Subtitle D landfill, and, as necessary, treatment of soil after excavation using chemical stabilization to address lead concentrations that exceed the TC regulatory threshold. Soil in yards that exceeds the RALs would be excavated from surface grade down to the native sand/soil horizon, which is estimated to be no more than 24 inches bgs, based on results of the RI. During the RI, native sand was encountered at every sample location between 0 and 24 inches bgs. RI results indicated that the native sand beneath the fill soils

at the site is both clean and by sight very easily distinguished from soil and fill material. The cost estimate assumes that all soil above the native sand would be excavated and disposed offsite. Since no local stockpile area has been identified, EPA assumes that soil would be loaded directly into roll-off containers and transported to the landfill. If EPA identifies a stockpiling location that is acceptable to the community, then it will reconsider stockpiling.

Each yard would be restored to its pre-remedial condition. Once the properties are sodded or seeded, O&M of the sod/seed, including watering, fertilizing, and cutting, would be conducted for 30 days. After the initial 30-day period, property owners would be responsible for the maintenance of their own yards. This alternative would result in the removal of all impacted soils (since excavations would go down to the native sand, and the native sand layer is clean). No institutional controls would be needed, and CERCLA would not require five-year reviews because waste would not be left in place above levels that allow for unlimited use and unrestricted exposure.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan evaluates each alternative against the nine criteria and notes how each compares to the other options under consideration. More details can be found in the FS Report.

The nine criteria are divided into three groups: threshold, balancing, and modifying criteria. Alternatives that do not meet the threshold criteria are not considered further.

Threshold Criteria

1. Overall Protection of Human Health and the Environment

This criterion assesses how well the alternatives achieve and maintain protection of human health and the environment.

Alternative 1 would provide no improvement over current conditions, would provide no risk reduction, and would not be protective of human health or the environment. Because Alternative 1 does not meet this threshold criterion, it is not discussed further in this section of the proposed plan.

Alternatives 3, 4A, and 4B are each expected to be effective remedies for OU1 that would be protective of human health and the environment by addressing the potential pathways of exposure to contaminated soils: ingestion, direct contact, and inhalation.

Ingestion of contaminated soils at the yards is the primary expected exposure route at the USS Lead site. Residents could be exposed to contaminants adhering to soils through ingestion of homegrown produce or through direct ingestion of contaminated soil. Alternatives 3, 4A, and 4B are all considered effective at preventing ingestion. Alternative 3 relies on a soil cover and compliance with institutional controls for its protectiveness, while Alternatives 4A and 4B would achieve protectiveness through the removal of contaminated soils.

Direct contact can result from recreational activities, gardening, landscaping, or excavation. Each of the active alternatives would prevent most direct contact by covering or removing the contaminated soils. However, direct contact may be more likely to result from unauthorized excavation activities for Alternative 3 because the contaminated soils would remain in place under a soil cover that is only 12 inches thick.

Exposure through inhalation would most likely occur through windborne transport of contaminated dust and soil due to the contaminants' strong tendency to adsorb to soil particles. Each of the active alternatives would prevent exposure to contaminated dust by removing or covering the contaminated soils.

Alternatives 3, 4A, and 4B address potential exposure to contaminants by covering or removing the contaminated soil. Alternative 4B would eliminate potential exposure because all of the contaminated soil would be removed down to native sand. Alternative 3 would leave

contaminated soil behind at all properties under a soil cover. Alternative 4A would leave contaminated soils in place at the few properties where soils below 2 feet may be contaminated. At those properties where contaminated soil remains at depth, EPA would rely on institutional controls (such as prohibiting excavation of contaminated soils) to prevent exposure.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

This criterion assesses how the alternatives comply with regulatory requirements. Federal and state regulatory requirements that are either applicable or relevant and appropriate are known as ARARs. Only state requirements that are more stringent than federal requirements are ARARs. There are three different types of regulatory requirements: chemical-specific ARARs, action-specific ARARs, and location-specific ARARs.

Alternatives 3, 4A and 4B would all achieve the identified ARARs. The potential ARARs are shown in Table 1.

Balancing Criteria

3. Long-term Effectiveness and Permanence

This criterion evaluates the effectiveness of the alternatives in protecting human health and the environment when the cleanup is complete. It also considers the effectiveness of the cleanup over the long term.

Each of the active alternatives would meet the RAO and provide long-term effectiveness and permanence once the RAO is met. The active alternatives are combinations of proven and reliable remedial processes, and the potential for failure of any individual component is low.

Alternative 3 would achieve long-term effectiveness through covering the metals-contaminated soil onsite as the primary component of the remedy, with O&M and institutional controls to ensure and verify the ongoing effectiveness of the remedy. Implementation of Alternative 3 would introduce topographic changes to the properties that must be maintained to ensure protectiveness. Therefore, O&M is critical to the protectiveness of this alternative to prevent erosion and potential exposure to contaminated soils that remain in place.

Alternative 4A would achieve long-term effectiveness by removing soil that exceeds RALs from OU1 and disposing of it at an off-site disposal facility. Alternative 4A has potential for some contaminated material to be left in place deeper than 24 inches bgs if the contamination exceeding RALs extends deeper than 24 inches. (Native sand was encountered above 24 inches bgs at all but a few locations in OU1 where borings were advanced). Any material exceeding RALs that is left in place would require O&M and institutional controls to maintain the remedy and prevent unacceptable exposures to waste left in place.

Alternative 4B would achieve long-term effectiveness by removing all non-native soils down to clean native sand from yards that exceeded RALs in OU1 and disposing of those materials at an off-site disposal facility.

Alternatives 3, 4A, and 4B are proven technologies that meet the requirements for long-term effectiveness and permanence. Compared to Alternative 3, Alternatives 4A and 4B provide an additional level of protectiveness because wastes above RALs will be removed and disposed off-site. Alternative 4B provides the greatest degree of long-term effectiveness and permanence because all soil exceeding RALs would be removed from impacted yards.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

This criterion addresses the preference for selecting remedial actions that use treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible encapsulation, or reduction of total volume of contaminated media.

As previously mentioned, EPA has estimated that approximately 7% of the soils at OU1 have lead concentration levels that would be considered

hazardous waste. These soils are considered principal threat wastes due to their toxicity and potential to leach to groundwater.

Alternative 3 does not reduce the toxicity, mobility, or volume of contaminated materials since no treatment is applied. Alternatives 4A and 4B would reduce the toxicity and mobility of those above-mentioned soils with lead levels that exceed the toxicity characteristic threshold through ex-situ treatment prior to disposal, but would not reduce the volume of contaminated materials. The amount of material requiring treatment is expected to be the same for Alternatives 4A and 4B.

5. Short-term Effectiveness

This criterion examines the effectiveness of the alternatives in protecting human health and the environment during the cleanup until the cleanup is complete. It also considers protection of the community, workers, and the environment during the cleanup.

For OU1, the short-term effectiveness criterion is primarily related to the volume of contaminated soils addressed in each alternative, the time necessary to implement the remedy, potential risks to workers, and potential impacts to the community during construction.

Each of the active alternatives would have short-term impacts including increased potential for exposure to lead-contaminated soils and construction-related risks. Potential for exposure to lead-contaminated soils would increase in the short-term through creation of dust during excavation activities and increased potential for workers to come in contact with lead-contaminated soils above RALs. Construction-related risks include traffic and noise from construction vehicles, increased wear on local roads, potential for vehicle accidents, and other risks associated with construction work. These impacts can be mitigated by implementing a project-specific health and safety plan, keeping excavation areas properly wetted to reduce the creation of dust, planning truck routes to minimize disturbances to the surrounding community, and other best management practices.

Alternative 3 requires the least disturbance of lead-contaminated soils and shortest construction time. Compared to Alternative 3, Alternatives 4A and 4B present greater short-term impacts because of the amount of materials moved to and from the site, as well as the increased duration of construction. The duration of the alternatives progresses from an estimated 18 months for Alternative 3 to 26 months for Alternative 4A, to 40 months for Alternative 4B. Increasing duration of construction increases truck traffic, potential for vehicle accidents, construction-related and exposure risks to workers, as well as additional qualitative impacts to the local community, such as noise and dust.

6. Implementability

This criterion assesses the technical and administrative feasibility of an alternative and the availability of required goods and services. *Technical feasibility* considers the ability to construct and operate a technology and its reliability, the ease of undertaking additional remedial actions, and the ability to monitor the effectiveness of a remedy. *Administrative feasibility* considers the ability to obtain approvals from other parties or agencies and the extent of required coordination with other parties or agencies.

Alternatives 3, 4A, and 4B are proven, readily implementable, and have been used successfully for other environmental cleanup projects. In addition, Alternatives 3, 4A, and 4B could all be completed using readily available conventional earth-moving equipment, and most of the necessary services and construction materials are expected to be readily available. Qualified commercial contractors with experience are available locally to perform the work.

Alternative 3 is more difficult to implement than 4A and 4B, since it requires more detailed remedial design plans to maintain safe grading for each of the contaminated yards. Raising the grade of each impacted yard by 1 foot under Alternative 3 would cause technical and administrative challenges. The areas where the soil cover must be tied into the existing grade (streets, etc.) would

require excavation and will likely erode more rapidly than the surrounding areas and cause physical safety concerns for the elderly and young. Each yard would need to undergo a custom remedial design to ensure proper storm water drainage from the property. In addition, community acceptance of Alternative 3 may be difficult to obtain.

All the action alternatives are administratively feasible. Although no permits would be required, a similar level of coordination would be needed with state and local parties during design and construction activities for all the action alternatives.

7. Cost

This criterion evaluates the capital and operation and maintenance costs of each alternative. Present-worth costs are presented to help compare costs among alternatives with different implementation times.

The three action alternatives are progressively more expensive. Alternative 3 is the least costly action alternative ($18.24 million) and Alternative 4A is the next most costly option ($28.94 million). Alternative 4B is the most costly alternative ($43.8 million), costing more than twice as much as Alternative 3.

Modifying Criteria

8. State/Support Agency Acceptance

This criterion considers the state's preferences among or concerns about the alternatives, including comments on regulatory criteria or proposed use of waivers.

The State of Indiana supports EPA's preferred alternative, Alternative 4A.

9. Community Acceptance

This criterion considers the community's preferences or concerns about the alternatives. Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the Record of Decision.

SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for addressing contamination at OU1 of the USS Lead Site is Alternative 4A (Excavation of Soil Exceeding RALs + Off-Site Disposal + *Ex-Situ* Treatment Option). Alternative 4A is preferred over the other alternatives because once implemented it would:

- immediately prevent exposure to contaminated soils that pose a risk to residents;
- prevent future exposure to residents with minimal potential restrictions on property use; and
- allow current land uses to continue.

The preferred alternative would achieve these performance goals within a reasonable time frame and at a lower cost than other excavation alternatives and requires minimal efforts to maintain protectiveness over the long-term. Alternative 4A meets the threshold criteria, meets RAOs, offers a high degree of long-term effectiveness and permanence, and represents the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria.

Based on the information available at this time, EPA and the State of Indiana believe that the preferred alternative will be protective of human health and the environment, comply with regulatory criteria, be cost-effective, and use permanent solutions and alternative treatment technologies to the maximum extent practicable. The preferred alternative may change in response to public comment or new information.

COMMUNITY PARTICIPATION

EPA and IDEM provide information regarding the cleanup of the USS Lead Site to the public through public meetings, the Administrative Record file for the site, the Site Information Repository at the East Chicago Public Library, and announcements published in the "Sun-Times" and "La Raza." EPA and IDEM encourage the public

to gain a comprehensive understanding of the Site by reviewing this proposed plan and the information available at the public repository.

The dates for the public comment period, the date, location, and time of the public meeting and the locations of the Administrative Record files are provided on the front page of this Proposed Plan.

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